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ABSTRACT

Industrial arts instruction for elementary school retarded children promotes sociovocational habits (such as consideration for others and thoroughness), and academic skills (such as perceptual-motor skills and number concepts), and also provides unique experiences with concrete materials. In addition to reinforcing the school's general goals, industrial arts can be a diversionary activity for the child. Behavioral goals incorporating sociovocational and academic skills should be established for pre-school through high school instruction to maximize the adult retardate's vocational adjustment. (CL)

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University of Minnesota Research, Development and Demonstration
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(Place of publication shown in parentheses where applicable)

1. C. Clark & J. Greco. MELMR (Minnesota Early Learning Development Measure) Glossary of Behavior and Items. Occasional Paper #18. June 1973.

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INDUSTRIAL ARTS FOR ELEMENTARY MENTALLY RETARDED CHILDREN: AN ATTEMPT TO REDEFINE AND CLARIFY GOALS[1]

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RESEARCH AND DEVELOPMENT CENTER
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The University of Minnesota Research, Development and Demonstration Center in Education of Handicapped Children has been established to concentrate on intervention strategies and materials which develop and improve language and communication skills in young handicapped children.

The long term objective of the Center is to improve the language and communication abilities of handicapped children by means of identification of linguistically and potentially linguistically handicapped children, development and evaluation of intervention strategies with young handicapped children and dissemination of findings and products of benefit to young handicapped children.

INDUSTRIAL ARTS FOR ELEMENTARY MENTALLY RETARDED CHILDREN: AN ATTEMPT TO REDEFINE AND CLARIFY GOALS[1]

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The goals of industrial arts as an integral special education service must be carefully examined, especially in light of the recent challenges of some widely accepted practices for educating retarded children (cf. Dunn, 1968).

This paper will speak to three goal-related questions which seem crucial for the planning of an industrial arts program to serve retarded children: (a) what competencies must the retarded adult have in order to be vocationally successful; (b) what can industrial arts offer in general to promote these vocational competencies at the elementary level; and (c) does industrial arts have anything special to offer retarded pupils?

a. What competencies must the retarded adult have in order to be vocationally successful?

Perhaps we will gain a better understanding of this problem if we begin by examining the vocational outlook for retarded adults. A growing number of persons in this country enjoy increased leisure time coupled with greater longevity. Such increases produce a burgeoning need for personnel in service occupations, i.e., occupations which are service oriented, not product oriented. This projection is supported by findings reported in recent presidential committee reports concerned with habilitation and employment of the mentally retarded. In these reports, the U. S. Department of Labor projects a 25% increase in service occupation opportunities in the next five years, while farm

employment, at one time a large employer of unskilled workers, is expected to diminish about 25% over the next five years, possibly as a result of technological advances in agriculture. Similar technological advances, however, are not as likely to do away with service jobs such as hotel room cleaning, patient bathing, etc. Indeed, large consumers of service-type labor, such as Howard Johnson, the Institute of Industrial Launderers, and the federal government have actively sought increasing numbers of mentally retarded persons for employment and report that their retarded employees make "exceptionally fine work records (President's Committees' report, 1961, p. 5)." However, in these same reports disturbing figures show that a considerable percentage of retarded adults who are in training for service occupations are unable to complete the training because of adjustment problems (36% terminated in the Institute of Industrial Launderers Project; 7% separated by the federal government; 35% terminated in the National Association for Retarded Children's restaurant employment training project). These figures are consistent with the findings of other investigations which also reveal that social inadequacy is the number one attritional factor among retarded trainees and employees (Warren, 1961; Collman & Neylyn, 1957; Shotwell, 1948).

It appears, then, that retarded adults tend to be terminated during vocational training or in their jobs because of social adjustment difficulties, a most serious problem considering that service occupations--the very occupations most often requiring social adjustment--are increasingly offering opportunities for the mentally retarded adult.

(b) what can industrial arts offer in general to promote vocational competencies at the prevocational level?

The Industrial arts shop and the entire school program should prepare the retarded child to be socially and vocationally competent. To understand the implications, perhaps we should view social and vocational (socio-vocational) competency as consisting of two domains: (a) competencies which the person carries within himself and applies to whatever social and vocational situations he encounters, i.e., communication and perceptual-motor competencies, and would lie in the effective domain; (b) competencies which are determined by external demands, e.g., the school room, the home, the part-time job and are tempered by these same external demands. These are the social and vocational habits and skills which are part of the competency itself and lie in the affective domain. Perhaps the conceptualization of these two competency domains will become clearer by looking at Table 1.[2]

Table 1 is an attempt to illustrate the adage that we are held accountable not only for what we say and do, but also how we say and do it. In the model, "say" and "do" are the two goal dimensions on the left side, i.e., communication and perceptual motor ability. Competency in these two goal dimensions is not sufficient in and of itself, however, since what one says and does is also judged by the manner in which it is projected--the affective dimension. These affective requirements should not be taught as isolated skills or habits. Rather, they should be considered in relation to the individual's school program at any given time. Thus, important socio-vocational skills and habits such as consideration for others and thoroughness should be learned by the preschool child at the same time

Table 1

Goals for the Mentally Retarded Individual In the Industrial Arts Program

Goals for the Individual (the Effective Domain)	School Continuum: Preschool period	Elementary School period	Jr. high and Sr. high period
	Underline indicates socio-vocational requirements in the affective domain		
Communication skills			
1. Reading	recognizes his name on tool chest and does not open until instructed to do so.	recognizes shop safety zones rapidly and without error.	reads help wanted section of the newspaper without assistance.
2. Writing	paints a board without spilling or smearing the paint.	records telephone messages accurately.	writes tool order from catalog using correct form and spelling.
3. Arithmetic	on command, can sort bolts according to length	accurately gives cost of his project to the nearest nickel	measures, using a tape, accurate to the nearest 1/8 inch.
4. Language	asks permission before opening paint jar	as shop foreman, he watches the clock carefully & announces clean-up at the correct time.	given an assembly task, works quickly & carefully & without unnecessary conversation.
Perceptual-motor skills			
1. Efficient locomotion	carries sharp tools carefully as he moves about the room	unloads lumber & piles it without injuring his partner	loads & wheels a hand cart without damaging the cartons or striking the walls

Table 1 (cont.) //

2. Efficient posture	does not knock his tools onto the floor as he sits at his bench	does not smudge his work in mechanical drawing	is able to work at a drill press continuously for one hour
3. Adequate eye-hand coordination	sandpaper's wood with the grain and cleans up afterwards	is able to keep his pencil on the ruler's edge & not break the lead as he draws a line	dips brush bristles into paint can without hitting the can rim
4. Etc.			

he learns to read. Indeed, they are an integral part of the milieu in which reading is taught. Moreover, by the time the child reaches senior high school where specific vocational skills are to be learned, he should have acquired an armamentarium of work habits and social skills which will enable him to be a good prospect for the senior high work adjustment program. When one considers all of this, it should be fairly clear that in addition to being concerned with the operations involved in building a project, the industrial arts teacher must also be concerned with the communication skills that are required to understand the blueprint and measure the stock; he must be concerned with the way his student's work in light of the socio-demands of the shop.

(c) Does industrial arts have any special qualities to offer in the education of retarded pupils?

I believe it has. First, the entire shop program could be structured to foster any and all of the skills previously discussed as long as the child regards industrial arts as highly reinforcing. This is not to say, however, that the industrial arts shop should become a "home base" for retarded children. I agree with Tisdall who cogently argues that the industrial arts teacher should not be expected to "take over" the school careers of retarded children; and that such an expectation could be the shortest route to the extermination of a sound shop program for normal children (Tisdall, 1964). Nevertheless, the industrial arts shop offers a socio-vocational setting which closely approximates the adult's occupational setting and could be appropriately structured to provide opportunities to learn and practice social and vocational habits and skills. Activities which

promote socio-vocational adjustment, e.g., clean-up sessions, maintenance activities, shop foreman responsibilities, etc. can be structured to maximize their impact and could be installed as an integral part of each shop class period.

But the shop setting itself is not the most important attribute that industrial arts has to offer the retarded child. The most important is the PROJECT. Of course the industrial arts project is important for all children, but it is particularly important for the retarded child because most of the other school tasks required of him are symbolic tasks such as reading and arithmetic which have form only as printed lines--lines whose mastery, while extremely important, is often an exercise in frustration for him. The typical shop project, on the other hand, has form and texture which literally can be trimmed and polished.

The project has other virtues too. For example, there is likely to be considerable learning value for the retarded child in the manipulative tasks provided in a project. Friedlander (1969), in a recent paper discussing the importance of manipulative tasks for helping retarded children learn arithmetic says, "A number of psychologists hold that the significance of this stage [Bruner's (1964) Enactive State, the stage where children learn largely from objects rather than pictures or symbols] is insufficiently recognized in planning educational programs for young children, especially for the retarded. He goes on to say that age and IQ designations do not adequately designate the point at which children are ready to go beyond this stage in their mental life, for even in adulthood many people find that physical movement, manipulative activity, and gestures are almost necessities in

working out difficult numerical and spatial problems [Friedlander, 1969, p. 82]."

Besides offering perceptual-motor stimulation, a project can also serve as form of "occupational therapy" for individuals who need it. In this regard, Betando (1963) perceives industrial arts activities as fulfilling two important therapeutic roles: (a) as diversional activities that relax the individual and boost his morale, and (b) as functional activities which can assist in the restoration of muscle function and improve the general physical condition of the individual.

Finally, the project possesses a quality that is not only special but also perhaps unique. Industrial arts projects can not only teach important construction skills, but they can also reinforce construction of other projects which have little reinforcement value of their own. This value is not found in the same abundance in most other school subjects, especially those that are highly academic. Thus, opportunities to build projects with high intrinsic reinforcement value can be provided as inducements for the construction of other projects which promote important socio-vocational skill development, but which have low intrinsic reinforcement value (See Table 2).

In Table 2, the value of utilizing one project as a reinforcer for another can be seen if one imagines that the opportunity to assemble a radio kit could be used as an incentive for helping to refinish school furniture.

In summary, the industrial arts shop can buttress the school's general goals as a place where communication, perceptual-motor, and socio-vocational skills may be learned in an applied, adult setting.

Table 2

PROJECTS WITH HIGH INTRINSIC REINFORCEMENT VALUE AND PROJECTS WITH SPECIAL VALUE FOR FOSTERING SOCIO-VOCATIONAL SKILL DEVELOPMENT

Project	Comment
a. Building a model boat	This type of project usually has high intrinsic reinforcement value for a retarded boy.
b. Constructing a play-house for a nearby nursery school	Important socio-vocational skills and habits can be promoted through a worthwhile effort such as this where students work together for the sake of helping others and for the good of the enterprise.
c. Refinishing school furniture	This project, as "b" above, possesses great socio-vocational learning possibilities. However, the shop teacher must guard against having too much of this kind of maintenance-type work foisted upon him and his pupils.
d. Assembling an inex-pensive radio kit	Mechanical and electronic devices which come in easily assembled form can provide worthwhile skill development possibilities for the retarded pupil. They also possess great intrinsic reinforcement value.
e. Turning a wooden berry masher on a lathe	This project usually has little intrinsic reinforcement potential, nor does it usually possess much socio-vocational skill development potential. Consequently, providing that wood turning skills can be incorporated into a project that has either high intrinsic reinforcement or high socio-vocational value, projects such as this should be avoided.

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Furthermore, besides promoting the school's general goals, industrial arts activities and instructional strategies can be specially designed to foster socio-vocational skills.

But, as noted, the attribute which seems most important for retarded children is the PROJECT. Not only does the project offer a chance to develop important perceptual-motor skills and provide enjoyment, it can also serve as an important reinforcement for the construction of projects which are important for their socio-vocational learning value.

It should be emphasized that the defining and refining of goals is an important first step, but certainly not a final step, in building a strong industrial arts program for elementary school retarded children. In order to make the program strong, the industrial arts teacher should refine the general goals presented in this paper, and then move to develop a catalog of behaviorally defined objectives which he can apply in his shop. This task might be facilitated by refering to the work of Kolstoe (1970) who has identified vocational competencies which he feels are appropriate across the school age continuum and beyond as shown in the following exerpt from his book, Teaching Educable Mentally Retarded Children:

PREPRIMARY LEVEL

1. Can count to 10
2. Can distinguish differences in shapes, colors, and sizes
3. Can name common objects by categories of use

PRIMARY LEVEL

1. Uses language to give and follow directions
2. Recognizes direction signs and warnings
3. Works toward task completions

INTERMEDIATE LEVEL

1. Can relate three or four events in chronological order
2. Can attend to tasks for an extended period of time
3. Can classify by use and physical characteristic
4. Knows the names and uses of hand tools

PREVOCATIONAL LEVEL

1. Can pay for lunches and transportation
2. Has a facility for the use of tools and materials
3. Understands how wages and hours are related
4. Knows his own vital statistics for filling out application forms
5. Knows the various jobs of the work world and something of the requirements of each

VOCATIONAL LEVEL

1. Reads adequately for self-protection and the welfare of others, such as safety signs and warnings
2. Uses proper language in association with co-workers and supervisors
3. Understands time and money management
4. Can evaluate his own efforts and production (Kolstoe, 1970, p. 143)

Having identified vocational competencies as Kolstoe has done, one could then attempt to transform them into behavioral objectives, perhaps after the fashion of Mager's (1962) work on preparing instructional objectives.[3] In this useful book, Mager breaks the task of writing a good objective into three steps as follows:

> First, identify the terminal behavior by name; you can specify the kind of behavior that will be accepted as evidence that the learner has achieved the objective.
>
> Second, try to define the desired behavior further by describing the important conditions under which the behavior will be expected to occur.
>
> Third, specify the criteria of acceptable performance by describing how well the learner must perform to be considered acceptable (Mager, 1962, p. 12).

An example of an objective for an elementary age retarded student, employing Mager's criteria would be: "given six boards of varying length (but none longer than three feet nor shorter than one inch) the student

will measure the length of each with a carpenter's ruler, making errors not to exceed one-eighth inch per board, and complete the entire task in less than five minutes."

This paper sought to define and clarify industrial art goals for elementary retarded children--a task which could result in the most important set of "blueprints" and "specifications" the industrial arts teacher is likely to ever produce.[4]

Footnotes

[1]This paper is based on a keynote address presented at a state conference for industrial arts teachers working with handicapped children. The conference, sponsored by the Wisconsin Department of Public Instruction, Division for Handicapped Children's Services, was held at Stout State University, Menomonie, Wisconsin, 1970.

[2]The four goal areas in Table 1 appear to be consonant with several widely accepted statements of goals (e.g., Kirk and Johnson, 1951; Robinson and Robinson, 1965) and represent a distillation of these and other statements of educational goals for retarded children.

[3]Other books which may be helpful in formulating objectives are:

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Krathwohl, D. R., Bloom, B. S., and Masia, B. B. Taxonomy of educational objectives Handbook II: Affective domain. New York: David McKay, Inc., 1964.

[4]The present author wishes to thank Robert H. Bruininks for his helpful suggestions concerning this manuscript, and William Thorn for assistance in editing the manuscript.

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